

XXXII.—*Note on the genus Siphonotreta, with a description of a new Species.* By JOHN MORRIS, F.G.S.

[With a Plate.]

AMONG the numerous interesting fossils collected by Mr. John Gray from the Wenlock limestone and shale in the vicinity of Dudley, is one which I feel convinced belongs to *Siphonotreta* (de Vern.), a genus of Brachiopoda, hitherto considered peculiar to the Silurian formations of Russia. The genus having been previously unnoticed in this country, and presenting some peculiarities both as regards the structure of the shell and the mode of attachment, it may not be uninteresting to offer a few general remarks on the subject; more especially as this genus, and some apparently allied forms, have been lately made the subject of a special notice by Dr. Kutorga of St. Petersburg. In this memoir* Dr. Kutorga has grouped together in one family (the Siphonotretæ) four genera, *Siphonotreta*, *Acrotreta*, *Schizotreta* and *Aulonotreta*, which scarcely present any character in common, and have been in part considered by preceding authors as belonging to different groups or distinct subfamilies of the Brachiopoda.

Differing from Dr. Kutorga upon the relative value of the characters of these genera, as well as their arrangement or the grouping of them in one family, and certainly objecting to that pernicious system of coining new generic names without a sufficiently valid reason, merely for the sake of introducing a more euphonious terminology, I cannot at the same time but freely acknowledge that palæontologists are indebted to him for his elaborate memoir, containing descriptions of some new and interesting forms, illustrated with many beautiful figures of the different species.

Of the above-mentioned genera, two have been known for about twenty years. One of them, remarkable for the immense abundance with which it occurs in the Lower Silurian grits of the north of Russia, its broken fragments disseminated in the plane of stratification, giving the rock a micaceous appearance, was first made known (1829) as a peculiar genus by Prof. Eichwald† under the name of *Obolus* (*Aulonotreta*, Kut.); about the same period (1830), Pander‡ gave the name *Ungula* to this fossil, which L. von Buch§ (1840) considered to be an *Orthis*. The other

* Ueber die Siphonotretæ, von Dr. S. Kutorga, Verhandlungen der Kaiserlichen Mineralogischen Gesellschaft für das Jahr 1847, p. 250, St. Petersburg, 1848.

† Zoologia specialis, 1829, vol. i. p. 274.

‡ Beiträge zur Geognosie des Russischen Reichs, 1830.

§ Beiträge zur Bestimmung der Gebirgsformationen Russlands, 1840.

form was also first noticed by Eichwald in 1829 as a *Crania* (*C. sulcata*, *C. unguiculata*), which he afterwards (1843) placed under *Terebratula**; subsequently however M. de Verneuil, in the second volume of the great work on Russia†, recognized the differences which separated these fossils from *Crania* and *Terebratula*, and gave them the very characteristic name of *Siphonotreta*, describing two species, *S. unguiculata* and *S. verrucosa*. Since the publication of the work on Russia, four additional species of the latter genus have rewarded the researches of Hern. v. Volborth and other Russian geologists, which are fully described, as well as those previously known, in the monograph by Dr. Kutorga above alluded to, and from which is extracted the following synopsis of the principal characters of the genera included by Dr. Kutorga in the family of Siphonotretæ.

SIPHONOTRETEÆ, *Kutorga*.

A. With a tubular closed siphon.

a. The external siphonal opening passes from the apex towards the anterior margin.

1. *Siphonotreta*, De Verneuil.

S. unguiculata, Eichw. sp.

S. conoides, Kut.

S. fornicata, Kut.

S. tentorium, Kut.

S. verrucosa, Vern.

S. fissa, Kut.

S. aculeata, Kut.

b. The siphonal opening is directed from the apex towards the dorsal margin.

2. *Schizotreta*, *Kutorga* (*Orbiculoidea*, D'Orbigny).

Opening narrow, slit-like; no area, nor mark of deltidium.

Sch. elliptica, Kut.

3. *Acrotreta*, *Kutorga*.

Opening elongated, oval; area triangular and flattened, with a deltidium-like furrow.

A. subconica, Kut.

A. recurva, Kut.

A. disparirugata, Kut.

B. With a furrow-like siphon, opened on the whole hinge area.

4. *Aulonotreta*, Kut. (*Obolus*, Eichw.; *Ungula*, Pander).

A. polita = *O. Apollinis*, *siluricus*, *ingricus*, Eichw.; *Orthis unguula*, Von Buch.

A. sculpta = *O. antiquissimus*? Eichwald.

“The Siphonotretæ are free, unattached Brachiopods ‡, whose

* *Beitragen zur Kenntniss des Russ. Reichs*, 1843.

† *Russia and the Ural Mountains*, by Sir R. I. Murchison, 1845, vol. ii. p. 286.

‡ Dr. Kutorga alludes to the shells not being solidly attached by either of the valves.

chief character consists in a short, perfectly straight, perforated beak, never bent towards the ventral valve. The walls of this beak are very thick, and hence it does not appear, as for instance in the *Terebratulæ*, hollow within, but solid and perforated by a narrow siphon, which serves for the reception of a cylindrical muscle of attachment.

“The beak presents two chief diversities of form: it is either drawn away, in very different degrees, from the hinge-margin towards the centre of the dorsal valve; that is, is placed at a greater or less elevation above the hinge-margin,—or it lies exactly in the same plane with the hinge-side of the dorsal valve. *In the first case* the dorsal valve has properly the form of a cone more or less inclined towards the hinge-side, and the siphon appears either as a perfect tube (*Siphonotreta*, *Acrotreta*), or as a tube opened up externally for a portion of its length from the apex of the cone (*Schizotreta*). *In the second case* the dorsal valve represents only the half of a cone, in which the shorter hinge or posterior part has been cut away from the apex to the basis, exactly in such a manner that the external opening of the beak is changed into a groove less than a semicircle in depth, and the siphon into a semicylindrical groove open along the whole length of the hinge-surface (*Aulonotreta*). See Pl. VII.

“In no portion of the shell of this group can we observe the slightest indication of a predominance of development; the central part is not distinguished from the marginal portions; hence neither valve shows either a *carina* or a *sinus*; the hinge-sides form together an arch, and pass imperceptibly into the lateral margins; there are no wing-shaped expansions of the hinge-margins, and finally, neither the cardinal nor anterior margins exhibit either folds, serratures, or excision.

“The anatomical structure of the shell of the *Siphonotretæ* is this. The whole inner surface is covered by a continuous layer which is so thin that it welds itself closely to, and takes the form of, all the larger prominences and folds of growth. This layer, from its position and colour, I shall call the *nacreous-layer* (Perlmutterschicht). The external surface of the shell is also covered by a continuous, but considerably thicker, corneous *epidermal-layer*, which is so much developed, and from its horny texture has so great durability, that sometimes, even when all the other layers are dissolved and vanished, it is still perfectly preserved—a peculiarity which, in the whole family of Brachiopods, is found only in this group and in the *Lingulæ*. This *epidermal-layer* also covers the inner wall of the siphon in all its diversity of forms. Lastly, the part between these two layers, and always the thickest, is the proper *calcareous shell*.”

Any remarks upon the above characters must be considered

merely provisional, having had but limited opportunities of inspecting specimens, and having seen but three of the four genera above described, and not any showing interior structure. In the collection of Sir R. I. Murchison are specimens of *Siphonotreta* and *Obolus* which I have been kindly allowed to examine: for the loan of *Orbiculoidea*, D'Orb., I am indebted to Mr. J. Gray of Dudley: with regard to *Acrotreta*, I have not seen the Russian specimens which are included in that genus, but the excellent figures given by Kutorga lead me to infer that they most probably belong to that section of the Spiriferæ constituting the genus *Cyrtia* of Dalman, for the mesial furrow traversing the depressed triangular area in two of the species figured (*A. subconica* and *A. recurva*) indicates a more complex arrangement on the hinge-line than is found in the hingeless Brachiopods.

As to the peculiar structure of the shell of *Siphonotreta*, which is a character of some value and at once distinguishes it from the other genera, it is not a little remarkable that neither M. de Verneuil nor Dr. Kutorga has figured it or alluded to it with sufficient importance. De Verneuil describes the shell as subcorneous, à surface chagrinée. Kutorga states the calcareous part proceeding from the apex to consist of a number of very flat rings or of many oblique cones truncated at the bases, whereas Sir R. Murchison's specimens of *Siphonotreta* exhibit, certainly a shell both calcareous and corneous, but with a distinctly perforated structure, as if composed of a series of oblique tubular layers, the perforated texture being larger than that found in the majority of *Terebratulæ*, and resembling that presented in *Ter. Capewelli* (Davidson), *Ter. hamifera* (Barr.), in the genus *Trematis* (Sharpe), and in some species of *Thecidea*; besides which the surface is ornamented, in all the described species, with numerous tubular spines, generally arranged in a very regular order, and leaving, when broken off, slightly projecting hollow tubercles in their place*. Neither of these characters are found in *Orbiculoidea*, D'Orb. (*Schizotreta*, Kut.), and *Obolus*, Eichw. (*Aulonotreta*, Kut.); their shells, although more solid and calcareous than the recent allies, are probably formed somewhat as in *Orbicula* and *Lingula*, and which are described by Dr. Carpenter as being "almost entirely composed of laminæ of horny matter, which are perforated by minute tubuli, closely resembling those of ivory in size and arrangement, and passing obliquely through the laminæ."

The genus *Schizotreta*, Kut., is synonymous with *Orbiculoidea*, D'Orb., and presents some, but probably only minor, characters

* The genera *Chonetes* and *Productus* are also furnished with tubular spines; in the former they are arranged along the cardinal margin of the dorsal valve, and in the latter are irregularly scattered over the surface.

which separate it from the ordinary *Orbicula*; the shell is generally more solid and calcareous, both valves are nearly equally convex, and the passage for the muscle of attachment, instead of being through a *longitudinal fissure* as in *Orbicula*, is considerably contracted, being confined to a small *tubular perforation* situated at the marginal end of a rather deep closed furrow. The pedunculated form assumed by the muscle of attachment in *Orbiculoidea* must have allowed greater freedom of motion to the animal, and may be the reason for the more conical development of the lower valve in this genus, as distinguished from the compressed form of the same valve in *Orbicula*. The contracted perforation in *Orbiculoidea* is well shown in the figure of *Orbicula Forbesii**, 'Memoirs Geol. Surv. of Gr. Britain,' vol. ii. pl. 26. f. 2, and is alluded to by Mr. Salter in his remarks on this species. This shell appears to be the same as the *Schizotreta elliptica*, Kutorga (1847), and is probably the older form of *Patella implicata*, Sow. 'Sil. Syst.' t. 12. f. 14 a, as well as identical with *Patella antiquissima*, Markl. (His. Let. Suec. t. 12. f. 11, and description), and is a type of D'Orbigny's *Orbiculoidea*.

With respect to *Obolus*, which has not yet been recorded as occurring in this country, I have, by the kind permission of Prof. E. Forbes, examined the fine collection of *Lingulae* possessed by the Museum of Practical Geology, without finding any form distinctly referable to Eichwald's genus. At present this shell is peculiar to Russia, being there widely distributed, and it appears to be one of the most ancient animal forms with which we are acquainted, for the beds containing it are altogether at the lowest limits of the fossiliferous deposits of Europe. It is somewhat remarkable, as mentioned by M. de Verneuil, that notwithstanding the extreme abundance of this shell in Russia, it has never been found on the other side of the Baltic, either in Sweden or Norway, where however exist grits of similar age to those of Russia, below the limestones containing *Asaphus expansus* and *Illenus crassicauda*. Nor has it been found in America: it appears in that country, as in the British Islands, to be synchronously represented by the genus *Lingula*, with which it has the nearest affinity; for Sir C. Lyell mentions that the lowest fossiliferous strata in the United States (those for instance near Lake Champlain) contain abundant fragments of *Lingula*, giving to the rock, as in the Obolite grits of Russia, a very micaceous appearance.

In the Russian specimens of *Obolus*, I could not detect the peculiar reticulated structure of *Siphonotreta*; the shell is cal-

* Mr. Gray of Dudley possesses beautiful specimens of this shell, from which collection Mr. Davidson described it in the 'Bull. de la Soc. Géol. de France,' vol. v. 2nd ser. t. 3. f. 45.

carco-corneous, more solid than *Lingula*, but closely allied to it, and differing from it in having one valve with a slight furrow for the passage of the pedicle, as well as some modifications in the interior structure of the valves.

The group of the Siphonotreteæ, Kut., are arranged by M. D'Orbigny, under the families Lingulidæ and Orbiculidæ, in his first great division of Brachiopoda, with the following characters (Comptes Rendus, vol. xxv. p. 267, Aug. 1847) :—

Lingulidæ. A pedicle or exterior muscle passing between the valves ; shell corneous ; animal fixed.

The beaks of both valves hollowed with a furrow for the passage of the muscle *Lingula*, Brug.

The beak of one valve only with a furrow for the passage of the muscle *Obolus*, Eichwald.

Orbiculidæ. The muscle passing out by the inferior valve ; shell free.

Shell testaceous, perforated ; muscle of attachment pedunculated, placed at the summit of the beak. *Siphonotreta**, De Verneuil.

Shell testaceous, perforated ; muscle of attachment placed by the side of the beak *Orbicella* †, D'Orb.

Shell corneous, not perforated ; muscle pedunculated.

Orbiculoidea, D'Orb.

Shell corneous, not perforated ; muscle not pedunculated.

Orbicula, Lam.

From the above general remarks, it will be evident that the four genera above mentioned cannot properly be arranged in the same family of which *Siphonotreta* is the type, and from which the other three are readily distinguished ; in fact, as previously observed, they belong to four distinct groups ; *Siphonotreta* being allied to *Crania*, *Schizotreta* to *Orbicula*, *Aulonotreta* to *Lingula*, and *Acrotreta* probably identical with *Cyrtia*.

I shall conclude these notes with the following brief description of the new species of *Siphonotreta* :—

Siphonotreta anglica. Pl. VII. fig. 1 a-c.

Shell of a rather oblong-oval form, depressed, marked by the fine lines of growth ; surface minutely but concentrically reticu-

* Mr. W. King places *Siphonotreta* in the family Craniidæ.

† *Orbicella*, D'Orb. (Aug. 1847), is stated by Mr. Davidson, 'Bull. Géol. Soc. France,' n. s. vol. v. p. 315, to be identical with the genus *Trematis*, Sharpe (June 1847). This can scarcely be the case, if both genera are correctly described ; for *Orbicella* is placed by D'Orb. among the hingeless Brachiopods, whereas Mr. Sharpe describes *Trematis* as having a hinge. The two diverging plates in the non-perforated valve of *Trematis* are somewhat remarkable, as, where they exist in other Brachiopoda, they always form internally the margins of the deltidial area, partly protecting the passage for the muscle of attachment, and forming the dental processes of the hinge.

lated, reticulation regular with quadrangular areolæ, and covered with many slender linear tubular spines or their bases, somewhat quincuncially arranged; spines smooth, dilated at the base, a little above which they remain of nearly uniform size throughout or very slightly tapering, and are regularly and transversely sulcated or contracted, giving the spines a beaded or jointed appearance.

The general form of the shell and quincuncial arrangement of the spines resemble *S. aculeata*, Kutorga, but as that author does not figure or allude to any reticulated structure or the moniliform spines*, this is considered to be distinct; unfortunately the specimen is much compressed, so that all the characters are not fully shown, and I have provisionally given the name of *S. anglica* until it can be compared with all the Russian species.

Locality. From the Wenlock shale near Dudley. Collection of Mr. J. Gray.

EXPLANATION OF PLATE VII.

- Fig. 1.* *Siphonotreta anglica.* *a.* Shell, natural size. *b.* Shell, magnified view. *c.* Spines enlarged. *d.* Portion of ditto, magnified. *e.* Outer surface of shell, magnified.
- Fig. 2 a.* *Siphonotreta verrucosa.* *b.* Side view. *c.* Surface of shell, magnified. *d.* Interior of dorsal valve.
- Fig. 3 a.* *Schizotreta = Orbiculoidea*, D'Orb., *O. Forbesii.* *b.* Showing longitudinal furrow and contracted perforation.
- Fig. 4.* *Acrotreta = Cyrtia?* *a.* Dorsal valve. *b.* Ventral valve.
- Fig. 5.* *Aulonotreta = Obolus.*

XXXIII.—*On the Animal of Dentalium Tarentinum.*

By WILLIAM CLARK, Esq.

To the Editors of the Annals of Natural History.

GENTLEMEN, Norfolk Crescent, Bath, Sept. 1, 1849.

THE animal I am about to present to your notice exhibits a series of characters of the highest interest, in its anatomy and functional developments, some of which are so anomalous that it must be considered one of the most singular of the testaceous mollusca.

From my observations in the September Number of the 'Annals,' it appears that the minute species of the genus *Cæcum*, from their configuration, have generally been located with the *Dentalia*, though it will be seen that there is little concordance

* The moniliform character of the spines may not be peculiar to this species, but will probably be found to belong to the whole genus, when the spines of the other species are carefully examined by a higher magnifying power than that used by Dr. Kutorga.